

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

International Application. No. | International Filing Date
PCT/DE99/00100 | 18 January 1999

Attorney's Docket Number

051480-5016

U.S. Application No. Unassigned

Priority Date Claimed
20 February 1998

424 Rec'd PCT/PTO 21 AUG 2000

Title of Invention

CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Applicant For DO/EO/US

Stephan BOLZ

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. [] This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. [] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. [] is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. [X] has been transmitted by the International Bureau.
 - c. [] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
 - a. [] are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. [] have been transmitted by the International Bureau.
 - c. [] have not been made; however, the time limit for making such amendments has NOT expired.
 - d. [] have not been made and will not be made.
8. [] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [] An oath or declaration of the inventors (35 U.S.C. 371(c)(4)).
10. [] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. [X] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
[] A SECOND or SUBSEQUENT preliminary amendment.
14. [] A substitute specification.
15. [] A Verified Statement Claiming Small Entity Status
16. [X] Other items or information:
 1. Preliminary International Examination Report - Supplement

17. [X] The following fees are submitted:

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search Report has been prepared by the EPO or JPO.....\$840.00

International preliminary examination fee paid to

USPTO (37 CFR 1.482).....\$670.00

No international preliminary examination fee paid to

USPTO (37 CFR 1.482) but international search fee

paid to USPTO (37 CFR 1.445(a)(2)).....\$690.00

Neither international preliminary examination fee

(37 CFR 1.482) nor international search fee

(37 CFR 1.445(a)(2)) paid to USPTO.....\$970.00

International preliminary examination fee paid to USPTO

(37 CFR 1.482) and all claims satisfied provisions

of PCT Article 33(2)-(4).....\$96.00

ENTER APPROPRIATE BASIC FEE AMOUNT =**\$ 840.00**

Surcharge of \$130.00 for furnishing the oath or declaration later than

[] 20 [] 30 months from the earliest claimed priority date

(37 CFR 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate	
Total Claims	16 - 20 =	0	X \$18.00	\$
Independent Claims	2 - 3 =	0	X \$78.00	\$
Multiple dependent claim(s) (if applicable)			+ \$260.00	\$
TOTAL OF ABOVE CALCULATIONS =				\$840.00

SEND ALL CORRESPONDENCE TO:

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Scott J. Ansell
Reg. No. 35,035*William O. Trousdel (Reg. No. 38,637), for:*

Submitted: August 21, 2000

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Stephan BOLZ)	
)	
Application No.: not yet assigned)	Group Art Unit: not yet assigned
)	
Filed: herewith)	Examiner: not yet assigned
)	
Title: CONTROL SYSTEM FOR AN)	
INTERNAL COMBUSTION ENGINE)	

PRELIMINARY AMENDMENT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to the examination of the above-identified application on the merits, please amend the application as follows:

IN THE CLAIMS:

Please amend claims 3-12 as follows:

Claim 3, line 1, change "the foregoing claim," to --claim 2,--.

Claim 4, line 1, delete "or 3".

Claim 5, line 1, change "any of the foregoing claims," to --claim 1,--.

Claim 6, line 1, change "any of the foregoing claims," to --claim 1,--.

Claim 7, line 1, change "any of the foregoing claims," to --claim 1,--.

Claim 8, line 1, change "any of the foregoing claims," to --claim 1,--.

Claim 9, line 1, change "any of the foregoing claims," to --claim 8,--.

Claim 9, line 2, change "is" to --are--.

Claim 10, line 1, change "any of the foregoing claims," to --claim 1,--.

Claim 11, line 1, change "the foregoing claim," to --claim 10,--.

Claim 12, line 1, change "any of the foregoing claims," to --claim 1,--.

Please add new claims 13-16 as follows:

--13. Control system according to claim 1, characterized in that the evaluating unit (211) is adjustable by the motor control (1).

14. Control system according to claim 1, characterized in that the interface (21) is arranged closer to the sensor (2) than to the motor control apparatus (1).

15. Sensor unit having:

- a sensor (2) with an interface (21),
- an evaluating unit (211) integrated into the interface (21) for the digitalization of measurements of the sensor (2),
- a connecting line (22) between the sensor (2) and the interface (21) for the transfer of measurements of the sensor.

16. Sensor unit according to claim 15, characterized in that the connecting line (22) between the sensor (2) and the interface (21) is sealed against moisture.--.

REMARKS

Claims 3-12 have been amended and claims 13-16 have been added. The amendment to claim 3 clarifies the dependency from claim 2, and the amendments to claims 4-12 eliminate the surcharge for multiple dependent claims.

Claims 13-16 have been added to recite features described in the specification. No new matter has been added.

Thus, claims 1-16 are submitted for examination.

Applicant respectfully submits that no new matter has been added by this Preliminary Amendment. Entry of the above amendment is respectfully requested.

If there is any fee due in connection with the filing of this Preliminary Amendment, please charge the fees to our Deposit Account No. 50-0310.

Respectfully submitted,
MORGAN, LEWIS & BOCKIUS LLP

Dated: 21 August 2000

By: William O. Frousdell (Reg. No. 38,637), for:
Scott J. Anchell
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Control System for an Internal Combustion Engine

The invention relates to a control system for an internal combustion engine with a motor control apparatus and a sensor which has an interface to the motor control apparatus.

For the control of internal combustion engine in motor vehicles, measurements made by exhaust probes are often needed. On account of the high exhaust temperatures the unit for evaluating the measurements is regularly situated not directly in the exhaust probe but in the motor control apparatus.

Increasingly, a very high resolution of the measurements is necessary. An example is the operation of a storage catalyst which stores nitrogen oxide when the motor is running lean and there is an excess of oxygen ($\lambda > 1$). If the nitrogen oxide concentration at the output of the catalyst increases, the nitrogen oxides stored in the storage catalyst must be reduced again by adjusting the fuel mixture to $\lambda \leq 1$. For this purpose an extremely precise and reliable exhaust gas measurement of great resolution is required, which can register even a concentration of 10 ppm. This signifies that measurement streams in the order of 50 nA must be evaluated.

On account of the high working temperature at the location of the exhaust gas probe the corresponding evaluating unit is regularly contained in the motor control apparatus.

DE 195 22 178 A1 discloses a detector apparatus for oxygen concentration with an exhaust gas probe and a motor controller. The controller comprises a heating control for the exhaust probe, a stream analysis circuit for detecting a current picked up by the exhaust probe, an analog-to-digital converter to convert the current to a digital signal, and a microprocessor to process sensor signals and to control an internal combustion engine. Due to electromagnetic interference occurring in the engine compartment of a motor vehicle, and as a result of parasitic conductances and capacitances, only signals which exceed a certain level can be evaluated.

In German Gebrauchsmuster G 89 10 740 a hot film air mass sensor with a mounting is disclosed, in which a sensor chip together with an evaluating circuit is arranged as a sensor unit in the air stream to be measured.

It is an aim of the invention to produce a control system for an internal combustion engine and a sensor unit to permit an especially precise control or regulation of an internal combustion engine with respect to the maintenance of defined exhaust gas limit values.

This aim is achieved with a control system and a sensor unit as defined in the independent claims. Advantageous embodiments are specified in the subordinate claims.

By integrating the evaluating unit into the interface of the sensor high leakage resistances, as required for precise measurement, can be achieved. The signal path from the sensor all the way to the evaluating unit can be protected easily and lastingly against the penetration of moisture, so that the occurrence of parasitic conductances and capacitances can be minimized.

The sensor and the evaluating unit are combined in one functional unit.

A sometimes necessary plug connector for the sensor can be expanded by a housing to contain the evaluating unit.

The conductors necessary for connecting the sensor and interface can quite easily be made waterproof, and provided with tension relief and protection against kinking.

Since the sensor with the evaluating unit integrated into the interface has an "intelligent interface," communication between the motor controller and the evaluating unit can be provided through a system bus. Additional sensors which also have an evaluating unit on hand can be connected to such a system bus. The system bus permits a reduction of the number of conductors connected to the motor controller. Therefore there is also a reduction of the number of plug pins on the motor controller, which consequently can be made more compact.

Due to the transfer of digital signals between the interface of the sensor and the motor controller the system is made less sensitive to electromagnetic interference.

If the evaluating unit includes a microprocessor or a computer, an especially easy calibration of the sensor can be carried out. Furthermore, a software update is possible in a vehicle that has already been delivered to the customer.

Preferably the evaluating unit integrated into the interface is as close as possible to the sensor, but spaced away from it so that unfriendly ambient conditions in the area of the sensor will not cause any interference with the operation of the evaluating unit.

By integrating the sensor and the electronics (evaluating unit) an individual
5 adjustment of the sensor and the electronics can be made to improve accuracy. The evaluating unit can regulate the sensor, for example by heating the sensor, and thus relieve the motor controller. Also, the evaluating unit can locally diagnose the functionality of the sensor. In case of a malfunction, the unit of sensor and interface, including the integrated evaluating unit, can easily be replaced without the need for adjustment to the motor
10 controller.

Additional advantages, features and applications of the invention will be found in the description of the embodiment in conjunction with the drawing.

The figure shows a control system with a controller and a sensor unit.

The interface 21 consists of a plug connector, an electrically conductive housing 23
15 for the plug connector and an evaluating unit 211 integrated into this connector housing. The housing 23 has a metal cooling surface 231 which can be configured as a cooling flange. The cooling surface 231 is connected through thermal path 232 to the surface of a power component 212. The evaluating unit 211 is made by casting it from plastic, e.g., silicone, together with the ends of signal-carrying connecting conductors 22, so that an optimum seal
20 against moisture is achieved. In spite of the sealing compound, the thermal path 232 together with the cooling surface 231 provides for an adequate removal of heat.

The sensor and the evaluating unit form a functional unit, namely a sensor unit.

A water-repellent (hydrophobic) membrane in the housing 23 permits a supply of air through connecting lines 11 which lead to the motor control apparatus 1. The exhaust probe
25 2 is supplied with an oxygen reference through a connecting line 22 which serves for heating the exhaust probe 2, since the latter, in contrast to a signal line among the connecting lines 22, is not cast together with the evaluating unit 211.

The connecting lines 22 between the exhaust probe and the interface 21 are approximately 0.15 m to 0.5 m long. The connecting lines 11 between the interface 21 and

the motor controller 1 are about 1.5 m to 5 m long. A good length for the connecting lines 22 to the probe 2, wherein on the one hand the electronics of the evaluating unit 211 is located far enough away from the heat-producing exhaust tract, without the occurrence of excessively great parasitic effects on the signal-carrying connecting lines 22, is about 0.3 m. Typically, then, the length of the connecting lines 11 between the interface 21 and the motor control 1 is approximately 2 m.

On account of the short distance between the interface 21 and the exhaust probe 2 the connecting lines 22 can easily be sealed against moisture and made safe against kinking. Therefore only extremely low parasitic conductances or leakage resistances occur in the range of more than 10 M Ω . Due to the short distance between the exhaust probe 2 and the interface 21, and more precisely the evaluation unit 211, the connecting lines 22 are not very sensitive to electromagnetic interference. The electromagnetic tolerance can be further improved if the connecting lines 22 are shielded. This is easily possible and inexpensive on account of the short distance which requires little flexibility.

The evaluating unit 211 according to the invention can easily detect currents of 50 nA and no noise or interference will prevent useful measurement results. The range of measurement of the nitrogen oxide probe extends down to 10 ppm.

The central component of the measuring and control electronics of the evaluating unit 211 is a microprocessor, and precisely a microcontroller with a nonvolatile memory and few hardware components. The latter include a voltage regulator to operate the microcontroller, a few active electronic components, and lastly an exhaust gas probe 2. Furthermore, the evaluating unit 211 has an impedance converter to adapt the high-resistance signals of the exhaust probe 2 to the impedance of an analog/digital converter integrated into the microcontroller. By means of a digital/analog converter the signals to be put out at the interface 21 to the connecting lines 22 are measured again so as to produce control signals for the operation of the exhaust probe and a reference signal.

Furthermore, the evaluating unit 211 has a generator to produce a test signal which serves for the indirect determination of the probe temperature by determining the probe impedance. Moreover, the evaluating unit 211 includes a power component for controlling

the heating of the exhaust probe by pulse-width modulation (PWM). The microcontroller controls the pulse width by the power component such that the probe temperature remains within the allowable working range. In the case of a nitrogen oxide probe this amounts typically to 750°C to 850°C.

5 A female connector 12 connects the interface, configured as a plug connector, to an energy source and through a system bus 111 to the motor controller 1. The system bus 111 is configured as a CAN bus.

10 At the interface 21 digital signals or pulse-width modulated (PWM) signals are delivered which are considered as digital signals in the meaning of the invention. These digital signals can easily be carried over great lengths in a motor compartment of a motor vehicle without problems, in contrast to the measurement signals of the exhaust gas probe 2.

15 Due to the use of a microprocessor in the evaluating unit 211 a long-lasting high accuracy of the electronics is achieved. In addition, manufacturing data on the exhaust probe 2 can be stored in the working memory of the microprocessor for correcting the measurement and control data.

20 On account of the digital interface 21 to the motor control apparatus 1, the number of the connecting lines 11 to the motor control apparatus can be definitely reduced. For example, there is no need for connecting lines for heating the probe. Two connecting lines 11 suffice as a system bus. Also, several units of sensors with evaluating units can be connected to a single system bus. The evaluating units must each have a bus controller. This function can be provided by the microprocessor of the evaluating unit 211.

Claims

1. Control system for an internal combustion engine, which has:
 - a motor control apparatus (1),
 - a sensor (2) with an interface (21) for the motor control apparatus,
 - an evaluating unit (211) integrated into the interface (21) for the digitalization of measurements made by the sensor (2),
 - a connecting line (22) between the sensor (2) and the interface (21) to transfer measurements made by the sensor,
 - a connecting line (11) to transfer the digitalized measurements from the evaluating unit (211) to the motor control apparatus (1).
2. Control system according to claim 1, characterized in that the interface (21) is a plug connector in whose casing (23) the evaluating unit is integrated.
3. Control system according to the foregoing claim, characterized in that the plug connector has an electrically conductive casing (23) to shield the evaluating unit (211).
4. Control system according to claim 2 or 3, characterized in that the plug connector or the corresponding female connector has a cooling flange or a cooling surface with a thermal connection to at least one power component of the evaluating unit (211).
5. Control system according to any of the foregoing claims, characterized in that the sensor (2) is an exhaust gas probe.
6. Control system according to any of the foregoing claims, characterized in that the interface (21) and the electrical connecting line (22) to the sensor are waterproof.

7. Control system according to any of the foregoing claims, characterized in that the connecting line (22) between the sensor (2) and the interface (21) is electromagnetically shielded.

8. Control system according to any of the foregoing claims, characterized in that the connecting line (11) to the motor control apparatus (1) is a system bus.

9. Control system according to any of the foregoing claims, characterized in that a plurality of sensors is connected through the system bus to the control apparatus (1).

10. Control system according to any of the foregoing claims, characterized in that the evaluating unit (211) has a microprocessor.

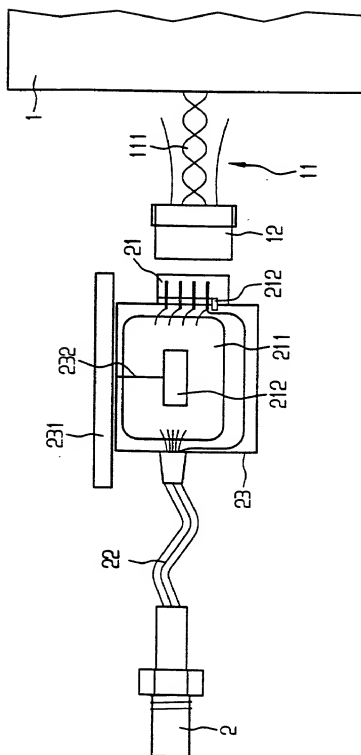
11. Control system according to the foregoing claim, characterized in that the microprocessor can be tuned with software to the individual sensor (2).

12. Control system according to any of the foregoing claims, characterized in that a heater of the sensor is controllable by the evaluating unit (211).

Abstract

A control system for an internal combustion engine has a motor control apparatus (1) and a sensor unit with an interface (21) to the motor control apparatus. An evaluating unit (211) is integrated into the interface for digitalizing measurements of the sensor.

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Declaration and Power of Attorney for Patent Application

Erklärung für Patentanmeldungen mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

daß mein Wohnsitz, meine Postanschrift und meine Staatsangehörigkeit den im nachstehenden nach meinem Namen aufgeführten Angaben entsprechen, daß ich nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent für die Erfindung mit folgendem Titel beantragt wird:

Steuersystem für eine Brennkraftmaschine
und Sensoreinheit

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Control System for an Internal Combustion
Engine

deren Beschreibung hier beigefügt ist, es sei denn (in diesem Falle Zutreffendes bitte ankreuzen), diese Erfindung

the specification of which is attached hereto unless the following box is checked:

☒ wurde angemeldet am 21 August 2000
unter der US-Anmeldenummer oder unter der
Internationalen Anmeldenummer im Rahmen
des Vertrags über die Zusammenarbeit auf
dem Gebiet des Patentwesens (PCT)
09/622,696 und am
abgeändert (falls zutreffend).

☒ was filed on 21 August 2000 as United
States Application Number or PCT International
Application Number 09/622,696 and
was amended on _____ (if
Applicable).

Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen Patentanmeldung, einschließlich der Ansprüche, die eventuell durch einen oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und verstanden habe.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Code of Federal Regulations, § 1.56 von Belang sind.

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office information which is material to the patentability of claims presented in this application in accordance with Title 37, Code of Federal Regulations, §1.56.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäß Title 35, US-Code, § 119 (a)-(d), bzw. § 365(b) aller unten aufgeführten Auslandsanmeldungen für Patente oder Erfinderurkunden, oder § 365(a) aller PCT internationalen Anmeldungen, welche wenigstens ein Land ausser den Vereinigten Staaten von Amerika benennen, und habe nachstehend durch ankreuzen sämtliche Auslandsanmeldungen für Patente bzw. Erfinderurkunden oder PCT internationale Anmeldungen angegeben, deren Anmeldetag dem der Anmeldung, für welche Priorität beansprucht wird, vorangeht.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate or §365(a) of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

Prior Foreign Applications
(Frühere ausländische Anmeldungen)

19807215.5	Germany
(Number)	(Country)
(Nummer)	(Land)
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(Number)	(Country)
(Nummer)	(Land)
_____	_____
(Number)	(Country)
(Nummer)	(Land)

20 February 1998

(Day/Month/Year Filed)

(Tag/Monat/Jahr der Anmeldung)

☐ Priority Not Claimed
Priorität nicht beansprucht

☐ Priority Not Claimed
Priorität nicht beansprucht

☐ Priority Not Claimed
Priorität nicht beansprucht

Ich beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

I hereby claim the benefits under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

Provisional Applications
(Hilfsanmeldungen)

(Application No.)
(Aktenzeichen)

(Application No.)
(Aktenzeichen)

(Application No.)
(Aktenzeichen)

(Filing Date)
(Anmeldetag)

(Filing Date)
(Anmeldetag)

(Filing Date)
(Anmeldetag)

Ich beanspruche hiermit die mir unter Title 35, US-Code, § 120 zustehenden Vorteile aller unten aufgeführten US-Patentanmeldungen bzw. § 365(c) aller PCT internationalen Anmeldungen, welche die Vereinigten Staaten von Amerika benennen, und erkenne, insofern der Gegenstand eines jeden früheren Anspruchs dieser Patentanmeldung nicht

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or § 365(c) of any PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior

in einer US-Patentanmeldung, bzw. PCT internationalen Anmeldung in einer gemäß dem ersten Absatz von Title 35, US-Code, § 112 vorgeschriebenen Art und Weise offenbart wurde, meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Title 37, Code of Federal Regulations, § 1.56 von Belang sind und die im Zeitraum zwischen dem Anmeldetag der früheren Patentanmeldung und dem nationalen oder im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT) gültigen internationalen Anmeldetags bekannt geworden sind.

Attorney Docket No. 051480-5016

application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to the patentability of claims presented in this application in accordance with Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application.

Prior U.S. Applications and PCT International Applications Designating the U.S.
(US-Patentanmeldungen und PCT internationalen Anmeldungen, welche die US benennen)

PCT/DE99/00100

18 January 1999

Pending

(Application No.)
(Aktenzeichen)

(Filing Date)
(Anmeldetag)

(Status) (patented, pending, abandoned)
(Status) (patentiert, schwebend, aufgegeben)

(Application No.)
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(Application No.)
(Aktenzeichen)

(Filing Date)
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(Status) (patented, pending, abandoned)
(Status) (patentiert, schwebend, aufgegeben)

VERTRETUNGSVOLMACHT: Als benannter Erfinder beauftrage ich hiermit eingeschrieben Praktiker Morgan, Lewis & Bockius LLP eingeschlossen ein Kunde Nummer beliefert unten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Angelegenheiten vor dem US-Patent und Markenamt. Gesamt korrespondenz sollte sein adressiert zur das Kunde Nummer.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the registered practitioners of Morgan, Lewis & Bockius LLP included in the Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. All correspondence should be addressed to that Customer Number.

Customer Number (Kunde Nummer): 009629

Postanschrift:

Send Correspondence to:

David W. Laub

Telefonische Auskünfte: (Name und Telefonnummer)

Direct Telephone Calls to: (name and telephone number)

David W. Laub (215-963-5355)

Ich erkläre hiermit, daß alle in der vorliegenden Erklärung von mir gemachten Angaben nach bestem Wissen und Gewissen der Wahrheit entsprechen, und ferner daß ich diese eidesstattliche Erklärung in Kenntnis dessen ablege, daß wissentlich und vorsätzlich falsche Angaben oder dergleichen gemäß § 1001, Title 18 des US-Code strafbar sind und mit Geldstrafe und/oder Gefängnis bestraft werden können und daß derartige wissentlich und vorsätzlich falsche Angaben die Rechtswirksamkeit der vorliegenden Patentanmeldung oder eines aufgrund deren erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Vor- und Zuname des einzigen oder ersten Erfinders:		Full name of sole or first inventor:	
Stephan BOLZ 19.10.2000		Stephan BOLZ Oct-19-2000	
Unterschrift des Erfinders: Datum:		Inventor's signature: Date:	
Stephan Bolz		Stephan Bolz	
Wohnsitz:		Residence:	
Pfatter, Bundesrepublik Deutschland		Pfatter, Federal Republic of Germany	
Staatsangehörigkeit:		Citizenship:	
Deutsche		German DE	
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Unterschrift des zweiten Erfinders: Datum:		Second inventor's signature: Date:	
Wohnsitz:		Residence:	
Staatsangehörigkeit:		Citizenship:	
Postanschrift:		Post Office Address:	
Vor- und Zuname des dritten Miterfinders (falls zutreffend):		Full name of third inventor, if any:	
Unterschrift des zweiten Erfinders: Datum:		Third inventor's signature: Date:	
Wohnsitz:		Residence:	
Staatsangehörigkeit:		Citizenship:	
Postanschrift:		Post Office Address:	

(Im Falle vierter und weiterer Miterfinder sind die entsprechenden Informationen und Unterschriften hinzuzufügen.)

(Supply similar information and signature for fourth and subsequent joint inventors.)